



# Project Facts

## Game Changer Improvements Could Dramatically Increase Domestic Oil Recovery Efficiency

The report, *Evaluating the Potential for "Game-Changer" Improvements in Oil Recovery Efficiency from CO<sub>2</sub> Enhanced Oil Recovery*, examines how a "step-change" in the efficiency of carbon dioxide-based enhanced oil recovery (CO<sub>2</sub>-EOR) would help to increase oil production from domestic reservoirs.

Currently available primary and secondary oil production technologies recover only about one-third of the oil in-place in domestic reservoirs, leaving behind massive volumes of oil in the ground ("stranded oil"). Yet, scientific theory, laboratory tests, and selected field projects show that significant increases in oil recovery efficiency are possible. This technical report examines the role that "next generation" CO<sub>2</sub>-EOR technologies could provide in making "game changer" improvements in domestic oil recovery efficiency and in increasing domestic oil production. Three significant findings emerge from this study:

**1. Traditionally practiced CO<sub>2</sub>-EOR technology will raise overall domestic oil recovery efficiency by only a few percent.** The reasons for this relatively modest performance include: (1) CO<sub>2</sub>-EOR is still only applied in a few domestic oil basins, primarily the Permian Basin; (2) the traditional form of this technology is economic in a relatively small group of geologically favorable oil reservoirs; and, (3) most important, traditionally used CO<sub>2</sub>-EOR designs provide only a modest, 10% incremental recovery of the original oil in-place.

**2. Integrated application of a suite of "next generation" technologies shows that much higher oil recovery efficiencies -- fully two-thirds of the oil in-place -- are feasible from an expanded group of domestic oil reservoirs.** The analysis shows that a series of "next generation" CO<sub>2</sub>-EOR technologies could double the oil recovery efficiency from geologically favorable oil reservoirs and raise overall domestic oil recovery efficiency to over 60% of the original oil in place. In addition, "next generation" technology could extend the miscible CO<sub>2</sub>-EOR technology to a broader range of domestic oil reservoirs.

**3. Successful development and integrated application of "next generation" CO<sub>2</sub>-EOR technologies could add 40 billion barrels of technically recoverable domestic oil resource (from the first six basins/regions studied).** The previously issued six "basin-oriented" CO<sub>2</sub>-EOR studies reported that 43.3 billion barrels of domestic oil could become technically recoverable with "state-of-the-art" CO<sub>2</sub>-EOR technology. Successful development and integrated application of "next generation" CO<sub>2</sub>-EOR technologies could increase this to 83.7 billion barrels, from these six domestic oil basins/areas. (*The potential for these "next generation" CO<sub>2</sub>-EOR technologies for the 10 basins/areas studied as of February 2006 has yet to be examined.*)

### Further information

This assessment was prepared by Advanced Resources International for the U.S. Department of Energy Office of Fossil Energy. Copies of the assessment are available at [www.fossil.energy.gov](http://www.fossil.energy.gov). For information about DOE Oil and Natural Gas Program research on emerging EOR technologies, see [www.netl.doe.gov](http://www.netl.doe.gov).

### Contact Points

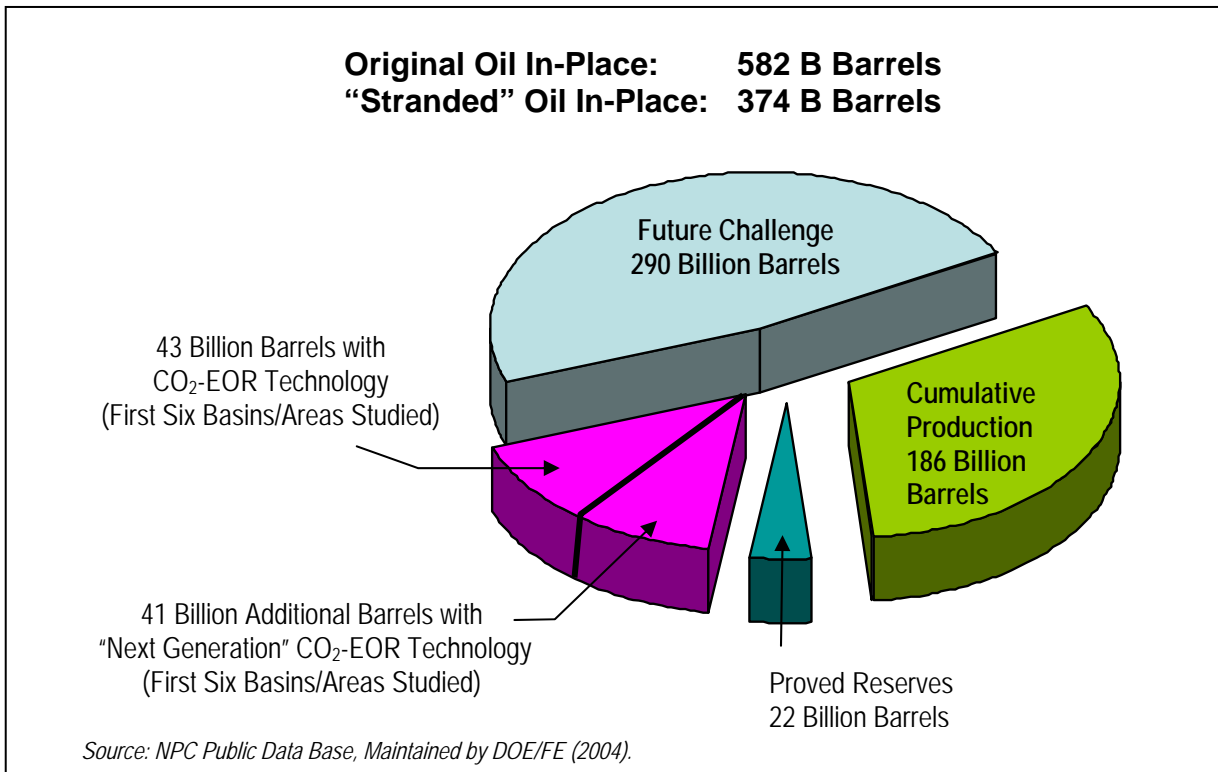
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### “Stranded” Domestic Oil Resources in Existing Oil Fields



### Technically Recoverable Oil Resource From “State-of-the-Art” and “Next Generation” CO<sub>2</sub>-EOR Technology

Basin/Area	No. of Large Geologically Favorable Reservoirs	All Reservoirs (First Six Basins/Areas Assessed)			
		OOIP* (Billion Barrels)	ROIP** (Billion Barrels)	Technically Recoverable (Billion Barrels)	
				State-of-the-Art	Next Generation
Alaska	33	67.3	45.0	12.4	23.8
California	96	83.3	57.3	5.2	13.3
Gulf Coast /East Texas	208	60.8	36.4	10.1	19.0
Oklahoma	71	60.3	45.1	9.0	20.1
Illinois	46	9.4	5.8	0.7	1.6
Louisiana Offshore (Shelf)	99	28.1	15.7	5.9	5.9
<b>Total</b>	<b>553</b>	<b>309.2</b>	<b>205.3</b>	<b>43.3</b>	<b>83.7</b>

\*Original Oil in-Place, in all reservoirs in six basins/areas. \*\* Remaining Oil in-Place, in all reservoirs in six basins/areas.  
Source: Advanced Resources International, 2005.